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NEC Express5800/GT110e-S Configuration Guide

Air cooling model

Introduction

This document contains product and configuration information that will enable you to configure your system. The guide will ensure fast and proper configuration of your NEC Express5800 server.

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Revision 2.0
NEC Corporation

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Technical Specification

Key Features

- Ultra compact form of 93mm in width, 13 liters in volume
- Up to 32 GB of high speed DDR3-1600 memory
- Full manageability by integrated EXPRESSSCOPE Engine 3
- Function in maximum 40° C / 104° F ambient temperature

Specification

3.5-inch Drive Model

Model		GT110e-S	
Part Number		N8100-1891F	
Processor	**Type**	Intel® Pentium® processor G640	Intel® Xeon® processor E3-1220 v2
	Clock speed	2.80 GHz	3.10 GHz
	Number of Processors	1	
	Cache	3 MB	8 MB
	Cores and Threads	2C / 2T	4C / 4T
Chipset		Intel® C204 Chipset	
Memory	**Type**	DDR3-1600 ECC Unbuffered DIMM	
	Standard Capacity	0 GB	
	Maximum Capacity	32 GB (4 x 8 GB)	
Internal Storage	**Standard Capacity**	0 GB	
	Maximum Capacity	6 TB (2 x 3 TB)	
	Disk Controller	SATA : 6Gb/s (Integrated)	
	RAID	SATA : [1] RAID 0/1	
	Hot Plug	-	
	Optical Disk Drive	DVD-ROM	
	3.5-inch Media Bays	1	
	Disk Drive Bays	2	
Expansion Slots		Total: 4 slots available 1 PCIe 3.0 [2] x16 (x16 connector) 2 PCIe 2.0 x4 (x8 connector) 1 32-bit/33 MHz PCI	
Video	**Controller (VRAM)**	Integrated in Server Management Controller (32MB)	
	Resolution / Color	1280 x 1024 / 16.7M [3]	
Interfaces		1 VGA (15-pin mini D-sub,1 rear) 1 to 2 Serial (9-pin mini D-sub, RS232-C, 1 to 2 rear) 8 USB2.0 (2 front, 4 rear, 2 internal) 2 1000BASE-T LAN connector (RJ-45, 2 rear) 1 100BASE-TX LAN connector for Management (RJ-45, 1 rear)	
Server Management		EXPRESSSCOPE Engine 3	
System Fan		Standard	
Power Supply		1 x 250 Watt 80 PLUS® Sliver certified non-Hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz	

Model		**GT110e-S**	
Power Consumption	**(Max. Config, Idling)**	70 VA / 65 Watt	73 VA / 69 Watt
	(Max. Config, Operating)	157 VA / 151 Watt	158 VA / 153 Watt
Acoustic Noise (Sound Pressure Level) [4]	**Minimum Config.**	29.1 dB	36.8 dB
	Maximum Config.	30.9 dB	37.2 dB
Dimensions (W x D x H)		93.0 x 386.5 x 363.0 mm / 3.6 x 15.2 x 14.3 in (4U)	
Weight (Minimum / Maximum)		9 kg / 12 kg, 19.84 lbs. / 26.46 lbs.	
Temperature, Relative Humidity (non-condensing)		Operating: 10° to 40° C / 50° to 104° F, 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%	
Regulatory and Safety		FCC, CE, BSMI, CCC, UL, CB, RoHS, WEEE	
Operating Systems and Virtualization Software		Microsoft® Windows Server® 2003 R2, Standard Edition SP2 or later Microsoft® Windows Server® 2003 R2, Enterprise Edition SP2 or later Microsoft® Windows Server® 2008 Standard Microsoft® Windows Server® 2008 Standard (x64) Microsoft® Windows Server® 2008 Enterprise Microsoft® Windows Server® 2008 Enterprise (x64) Microsoft Windows Server 2008 R2 Standard Microsoft Windows Server 2008 R2 Enterprise Red Hat Enterprise Linux 5.8 or later [5] Red Hat Enterprise Linux 5.8 or later (EM64T) [5] Red Hat Enterprise Linux 6.2 or later [5] Red Hat Enterprise Linux 6.2 or later (EM64T) [5] VMware ESXi™ 5.0 update 1 [6], VMware ESXi™ 5.1 [6]	

1 Embedded SATA RAID controller is supported only on Windows operating systems.

2 The PCIe x16 slot works at PCIe 2.0 speeds on Pentium processor systems.

3 Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.

4 Noise emission was measured in accordance with ISO 7779. The actual value may vary by the operating environment.

5 For Linux support, contact your sales representative or go to the NEC website at: http://www.nec.com/global/prod/express/linux/index.html

6 VMware ESXi is supported only on Xeon processor systems.

2.5-inch Drive Model

Model		GT110e-S	
Part Number		N8100-1892F	
Processor	**Type**	Intel® Pentium® processor G640	Intel® Xeon® processor E3-1220 v2
	Clock speed	2.80 GHz	3.10 GHz
	Number of Processors	1	
	Cache	3 MB	8 MB
	Cores and Threads	2C / 2T	4C / 4T
Chipset		Intel® C204 Chipset	
Memory	**Type**	DDR3-1600 ECC Unbuffered DIMM	
	Standard Capacity	0 GB	
	Maximum Capacity	32 GB (4 x 8 GB)	
Internal Storage	**Standard Capacity**	0 GB	
	Maximum Capacity	SAS : 4.5 TB (5 x 900 GB) [1] SATA : 5 TB (5 x 1 TB) [1] SSD : 500 GB (5 x 100 GB) [1]	
	Disk Controller	SATA : 6Gb/s and/or 3Gb/s (Integrated) SAS : 6 Gb/s (Optional)	
	RAID	SATA : RAID 0/1 [2] (Standard), RAID 5/6 (Optional) SAS : RAID 0/1/5/6/10 (Optional)	
	Hot Plug	Supported	
	Optical Disk Drive	DVD-ROM	
	3.5-inch Media Bays	1	
	Disk Drive Bays	3 to 5 [1]	
Expansion Slots		Total: 4 slots available 1 PCIe 3.0 [3] x16 (x16 connector) 2 PCIe 2.0 x4 (x8 connector) 1 32-bit/33 MHz PCI	
Video	**Controller (VRAM)**	Integrated in Server Management Controller (32MB)	
	Resolution / Color	1280 x 1024 / 16.7M [4]	
Interfaces		1 VGA (15-pin mini D-sub,1 rear) 1 to 2 Serial (9-pin mini D-sub, RS232-C, 1 to 2 rear) 8 USB2.0 (2 front, 4 rear, 2 internal) 2 1000BASE-T LAN connector (RJ-45, 2 rear) 1 100BASE-TX LAN connector for Management (RJ-45, 1 rear)	
Server Management		EXPRESSSCOPE Engine 3	
System Fan		Standard	
Power Supply		1 x 250 Watt 80 PLUS® Sliver certified non-Hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz	
Power Consumption	**(Max. Config, Idling)**	77 VA / 74 Watt	79 VA / 76 Watt
	(Max. Config, Operating)	166 VA / 164 Watt	169 VA / 166 Watt
Acoustical Noise (Sound Pressure Level) [5]	**Minimum Config.**	29.5 dB	37.3 dB
	Maximum Config.	37.6 dB	39.8 dB
Dimensions (W x D x H)		93.0 x 386.5 x 363.0 mm / 3.6 x 15.2 x 14.3 in (4U)	
Weight (Minimum / Maximum)		9 kg / 12 kg, 19.84 lbs. / 26.46 lbs.	

Model	GT110e-S
Temperature, Relative Humidity (non-condensing)	Operating: 10° to 40° C / 50° to 104° F, 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%
Regulatory and Safety	FCC, CE, BSMI, CCC, UL, CB, RoHS, WEEE
Operating Systems and Virtualization Software	Microsoft® Windows Server® 2003 R2, Standard Edition SP2 or later Microsoft® Windows Server® 2003 R2, Enterprise Edition SP2 or later Microsoft® Windows Server® 2008 Standard Microsoft® Windows Server® 2008 Standard (x64) Microsoft® Windows Server® 2008 Enterprise Microsoft® Windows Server® 2008 Enterprise (x64) Microsoft Windows Server 2008 R2 Standard Microsoft Windows Server 2008 R2 Enterprise Red Hat Enterprise Linux 5.8 or later [6] Red Hat Enterprise Linux 5.8 or later (EM64T) [6] Red Hat Enterprise Linux 6.2 or later [6] Red Hat Enterprise Linux 6.2 or later (EM64T) [6] VMware ESXi™ 5.0 update 1 [7], VMware ESXi™ 5.1 [7]

1 An optional HDD Cage is required to install more than 3 hard drives. The optional HDD Cage occupies 3.5-inch media bay.

2 Embedded SATA RAID controller is supported only on Windows operating systems.

3 The PCIe x16 slot works at PCIe 2.0 speeds on Pentium processor systems.

4 Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.

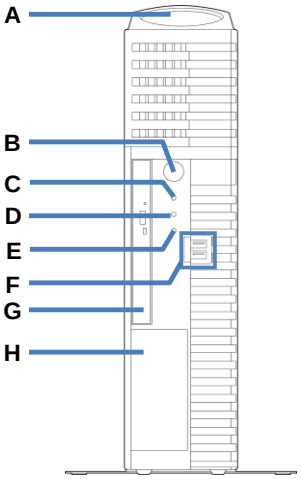
5 Noise emission was measured at the operator positions in accordance with ISO 7779. The actual value may vary by the operating environment.

6 For Linux support, contact your sales representative or go to the NEC website at: http://www.nec.com/global/prod/express/linux/index.html

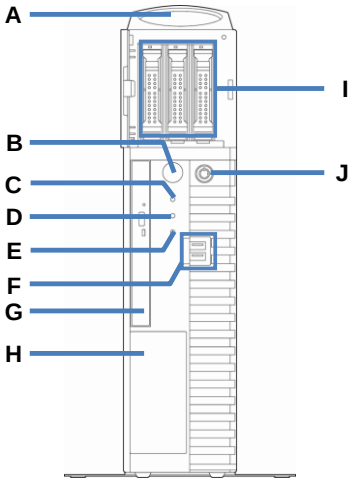
7 VMware ESXi is supported only on Xeon processor systems.

External Views

Front View



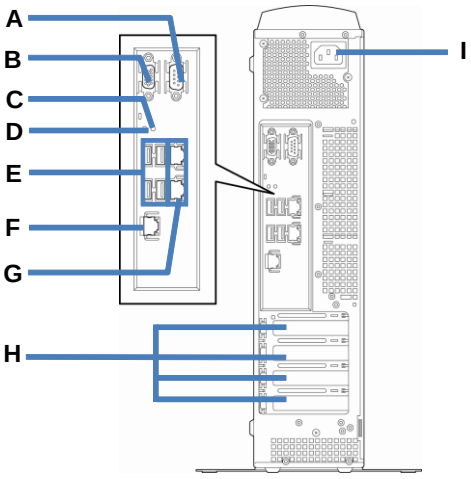
3.5-inch Drive Model



2.5-inch Drive Model

Legend			
A.	Vent Holes Cover	**F.**	USB Connectors
B.	Power Button	**G.**	Optical Disk Drive
C.	Power LED	**H.**	3.5-inch Media Bay
D.	Hard Drive Activity LED	**I.**	2.5-inch Drive Bay
E.	System Status LED	**J.**	Drive Bay Cover Key

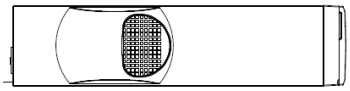
Rear Views

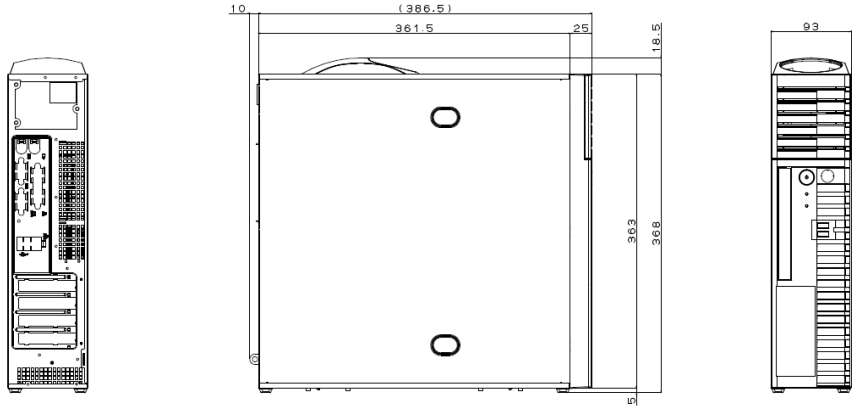


Leged			
A.	Serial Port Connector	**F.**	Management LAN Connector
B.	VGA Connector	**G.**	Data LAN Connectors
C.	BMC Reset Switch	**H.**	PCI Slots (Low Profile)
D.	Dump (NMI) Switch	**I.**	AC Inlet
E.	USB Connectors		

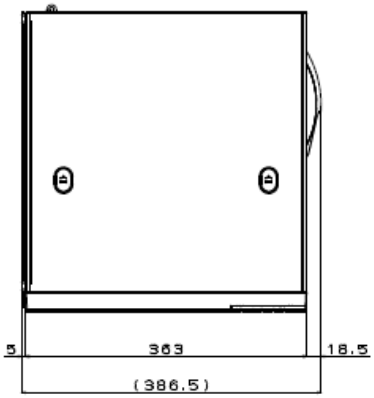
Dimensions (mm)

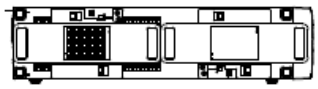
Tower installation

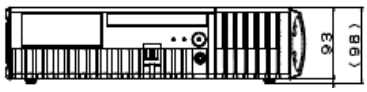


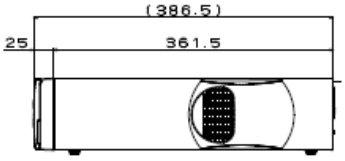


Lay-flat installation



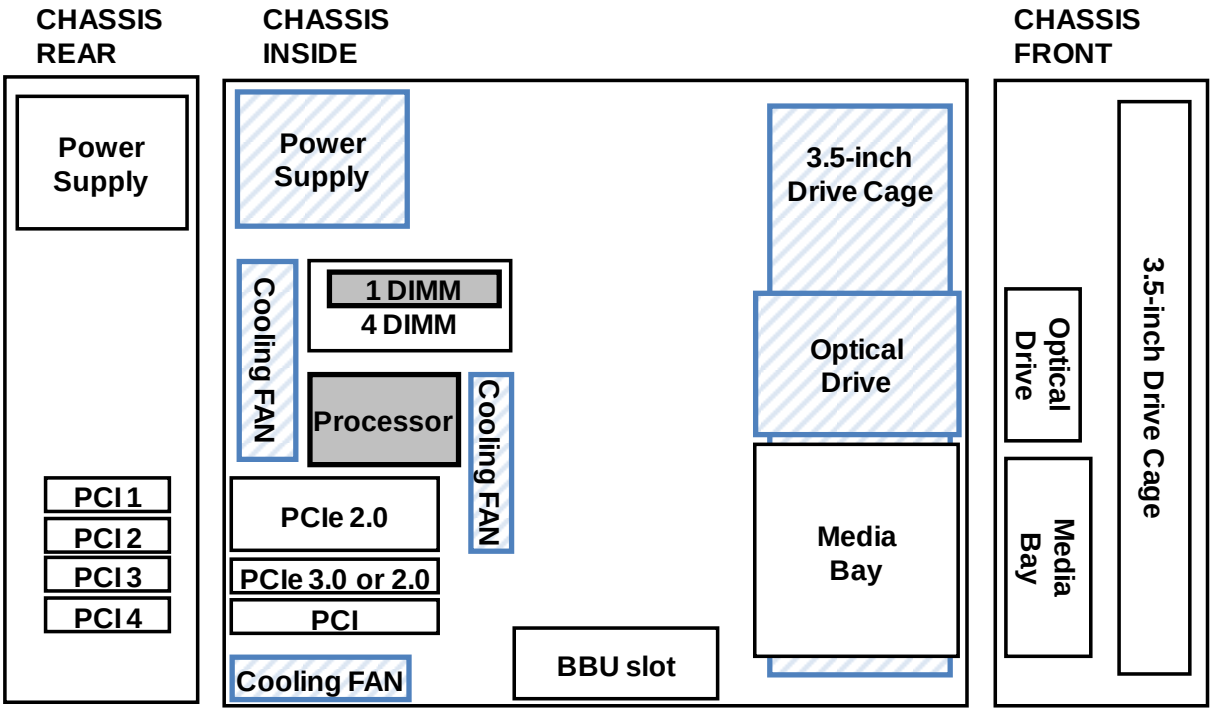






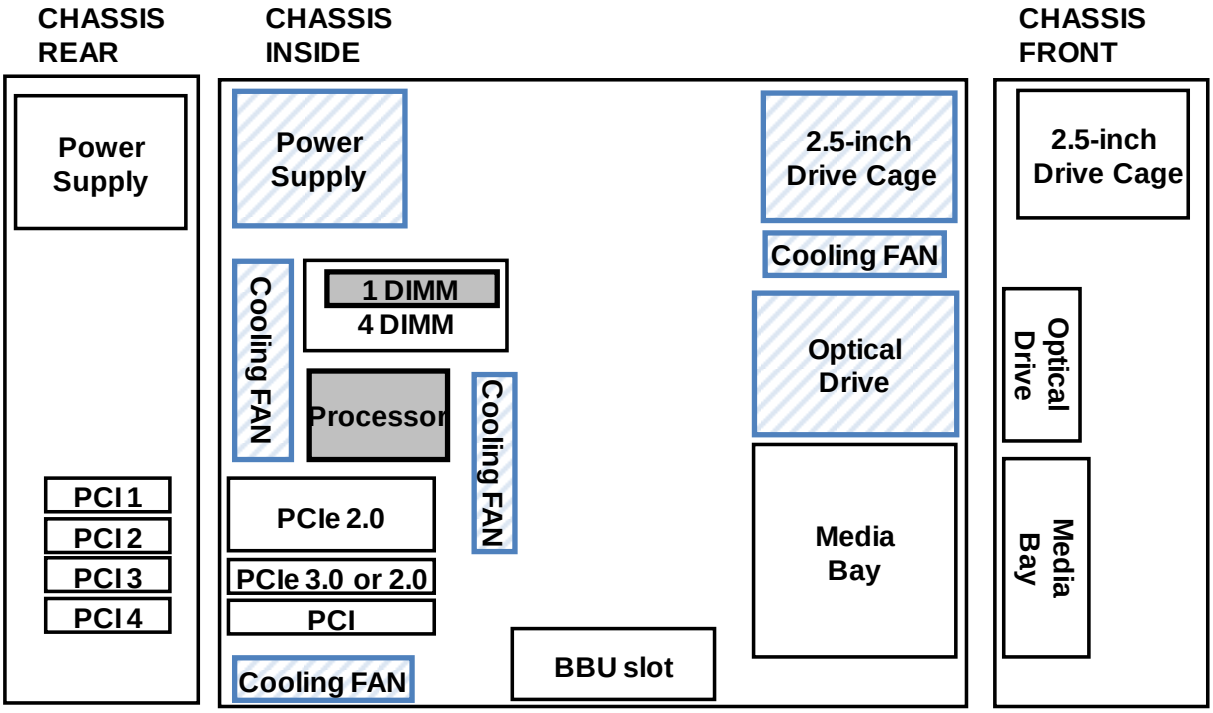
Configuration Diagram

3.5-inch Drive model



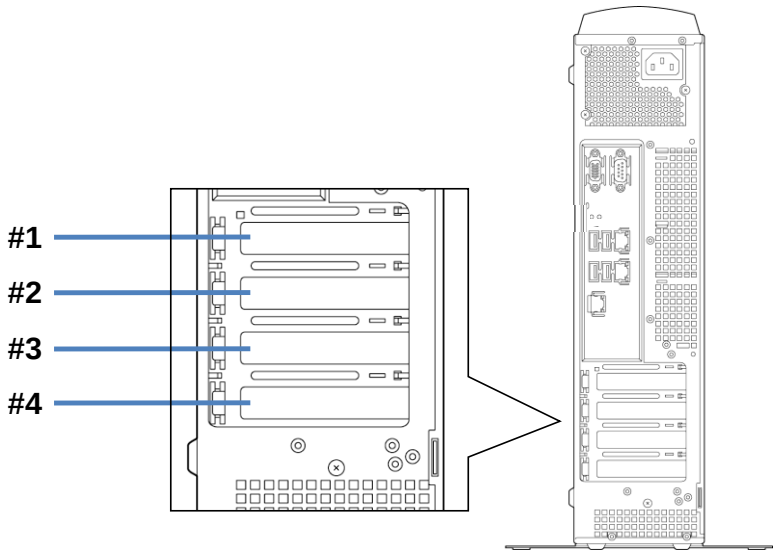
Legend: Minimum requirement components Standard components

2.5-inch Drive model



Legend: Minimum requirement components Standard components

Expansion Slots



Legend	
#1	PCIe 2.0 x4, x8 connector, Low Profile, up to 167.6mm length
#2	PCIe 2.0 x4, x8 connector, Low Profile, up to 167.6mm length
#3	PCIe 3.0 or 2.0 x16, x16 connector, Low Profile, up to 167.6mm length
#4	32-bit / 33 MHz / 5 V PCI, Low Profile, up to 167.6mm length

NOTE:

- The slot #3 works at PCIe 3.0 speeds on Xeon processor systems.

Server Configuration

1 Base Models

Product Name / Description	Part Number
NEC Express5800/GT110e-S no CPU, no RAM, no 3.5-inch HDD, no AC cable Including: Slim DVD-ROM drive, 3.5-inch Drive Cage, 250 Watt non-hot plug power supply, EXPRESSBUILDER DVD	N8100-1891F
NEC Express5800/GT110e-S no CPU, no RAM, no 2.5-inch HDD, no AC cable Including: Slim DVD-ROM drive, 2.5-inch Drive Cage, 250 Watt non-hot plug power supply, EXPRESSBUILDER DVD	N8100-1892F

2 Processor

Available sockets: 1

Category	Product Name / Description	Part Number
Processors **Required**	**Processor Kit (2C/G640)** Intel® Pentium ® Processor G640 (2.80 GHz, 2C/2T, 3 MB)	N8101-586F
	Processor Kit (4C/E3-1220v2) Intel® Xeon ® Processor E3-1220v2 (3.10 GHz, 4C/4T, 8 MB)	N8101-587F

NOTE:

- One processor kit from above must be installed.

3 Memory

Available slots: 4

Product Name / Description	Part Number
2GB DDR3-1600 UNB Memory Kit 2GB Unbuffered ECC DIMM, DDR3-1600(PC3-12800)	N8102-501F
4GB DDR3-1600 UNB Memory Kit 4GB Unbuffered ECC DIMM, DDR3-1600(PC3-12800)	N8102-502F
8GB DDR3-1600 UNB Memory Kit 8GB Unbuffered ECC DIMM, DDR3-1600(PC3-12800)	N8102-503F

NOTE:

- Minimum one memory kit must be installed.
- To install by double of memory kit is recommended in order to increase memory transfer speed by the dual-channel symmetric configuration.

Maximum Available Memory

See the table below for the maximum memory size that you can actually use on your system.

The maximum available memory is less than the maximum physical memory supported by your system because some chipsets require PCI resource space of about 750MB. PCI resource requirements vary depending on the type and the number of PCI cards you are using.

Maximum memory size supported by OS		Maximum available memory
Microsoft Windows Server 2003 R2, Standard Edition Microsoft Windows Server 2008 Standard	**4 GB**	**4 GB(HW-DEP enabled)** **App. 3.5 GB (HW-DEP disabled)**
Microsoft Windows Server 2003 R2, Standard x64 Edition Microsoft Windows Server 2008 Standard (x64) Microsoft Windows Server 2008 R2 Standard (x64)	**32 GB**	**32 GB**
Microsoft Windows Server 2003 R2, Enterprise Edition Microsoft Windows Server 2008 Enterprise	**64 GB**	**32 GB**
Microsoft Windows Server 2003 R2, Enterprise x64 Edition	**1 TB**	**32 GB**
Microsoft Windows Server 2008 Enterprise (x64) Microsoft Windows Server 2008 R2 Enterprise (x64)	**2 TB**	**32 GB**
Red Hat Enterprise Linux 5 Red Hat Enterprise Linux 6	**16 GB**	**16 GB**
Red Hat Enterprise Linux 5 (EM64T)	**1 TB**	**32 GB**
Red Hat Enterprise Linux 6 (x86_64)	**2 TB**	**32 GB**
VMware ESXi 5.0[1] VMware ESXi 5.1[1]	**2 TB**	**32 GB**

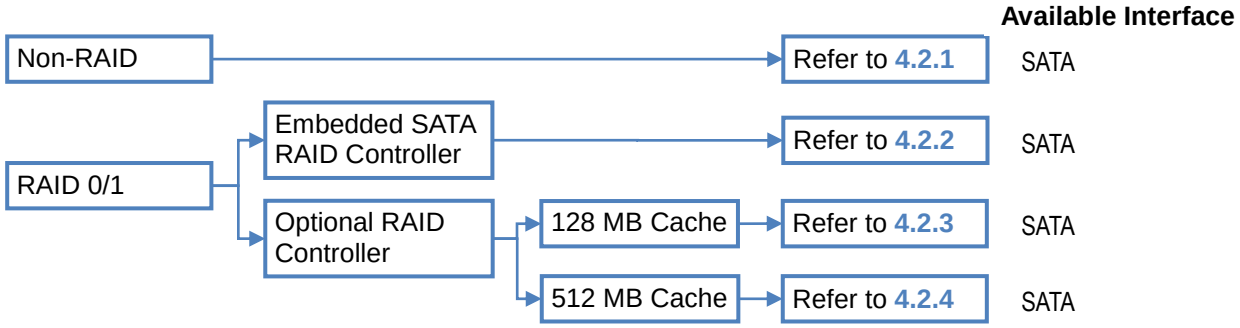
[1] Up to 1 TB of the main memory is available to each virtual machine.

4 Internal Hard Disk Drives

4.1 RAID Configuration

Refer to the section in accordance with your disk form factor and RAID configuration

4.1.1 3.5-inch Drive

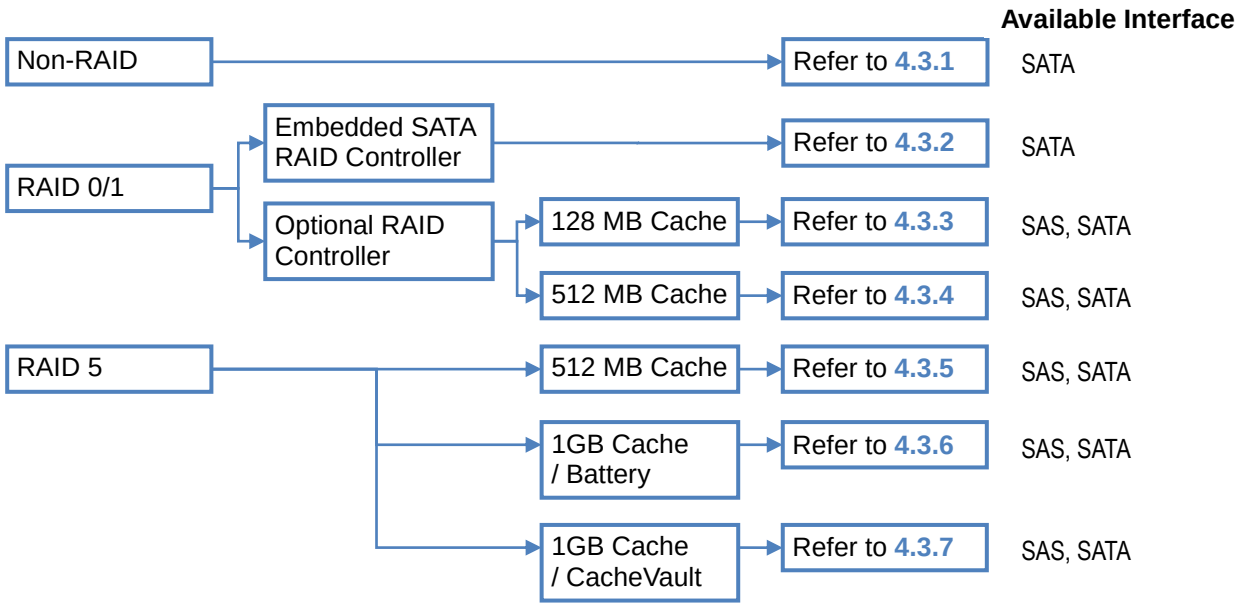


NOTE:

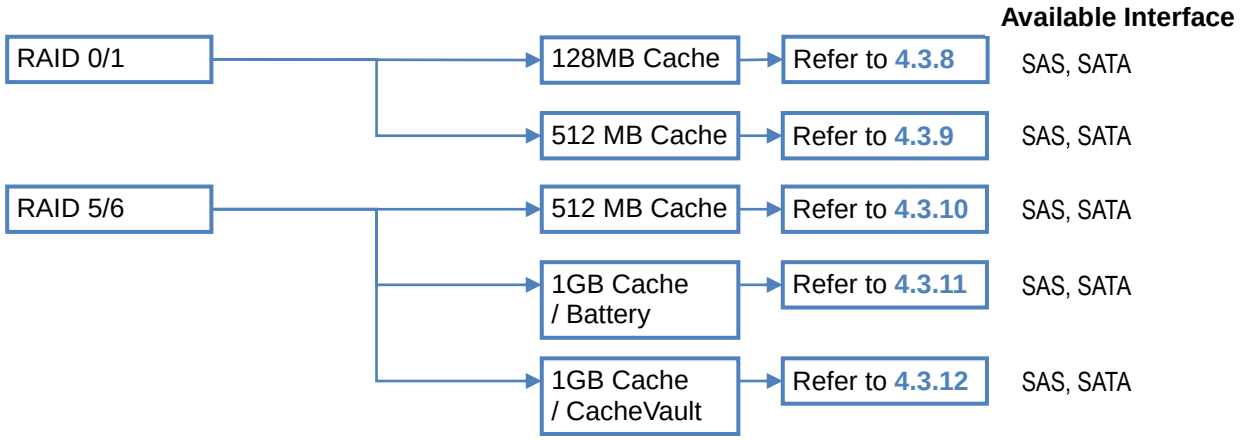
- Embedded SATA RAID controller is supported only on Windows operating systems. An optional RAID controller is required to configure RAID array for other operating systems.
- All hard drives within a RAID array should be of the same capacity.

4.1.2 2.5-inch Drive

Up to three drives



Up to five drives



NOTE:

- Embedded SATA RAID controller is supported only on Windows operating systems. An optional RAID controller is required to configure RAID array for other operating systems.
- All hard drives within a RAID array should be of the same capacity and rotation speed.
- Mixing SAS and SATA hard drives in the same system is not supported.
- All hard drives within a system should be of the same rotation speed.
- Hot plug insertion/removal is not supported with the embedded SATA non-RAID controller.

4.2 3.5-inch Drive Configuration

4.2.1 Embedded SATA non-RAID Controller

Category	Product Name / Description	Part Number
Storage Controller	**Embedded SATA Controller** 2x 6Gb/s SATA,	(Standard)
Cable	**Internal SATA Cable** Single-SATA to Single-SATA , 2 sets	(Standard)
Drive Cage	**3.5-inch Drive Cage** 2 x 3.5-inch non hot plug (fixed) hard drive bays	(Standard)
Drive **2 slots available**	**500GB 7.2K non-Hot Plug 3.5-inch SATA HDD** 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-359
	1TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-360
	2TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-361

4.2.2 Embedded SATA RAID Controller

Category	Product Name / Description	Part Number
Storage Controller	**Embedded SATA Controller** 2x 6Gb/s SATA, RAID 0/1 capable	(Standard)
Cable	**Internal SATA Cable** Single-SATA to Single-SATA , 2 sets	(Standard)
Drive Cage	**3.5-inch Drive Cage** 2 x 3.5-inch non hot plug (fixed) hard drive bays	(Standard)
Drive **2 slots available**	**500GB 7.2K non-Hot Plug 3.5-inch SATA HDD** 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-359
	1TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-360
	2TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-361
	3TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 3TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-362

NOTE:

- Embedded SATA RAID controller is supported only on Windows operating systems. An optional RAID controller is required to configure RAID array for other operating systems.
- All hard drives within a RAID array should be of the same capacity.

4.2.3 RAID 0/1 Controller with 128 MB Cache

Category	Product Name / Description	Part Number
Storage Controller Required	**RAID Controller (128MB, RAID 0/1)** Promise SuperTrak TX8760T-128 RAID 0/1/10, 128MB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 3Gb/s	N8103-128
RAID BBU Recommended	**RAID Battery Backup Unit** for Promise SuperTrak TX8760T	N8103-141
Cable Required	**Internal SATA Cable** mini-SAS to 2x Single SATA	K410-253(00)
Drive Cage	**3.5-inch Drive Cage** 2 x 3.5-inch non hot plug (fixed) hard drive bays	(Standard)
Drive 2 slots available	**500GB 7.2K non-Hot Plug 3.5-inch SATA HDD** 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-359
	1TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-360
	2TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-361
	3TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 3TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-362

NOTE:

- All hard drives within a RAID array should be of the same capacity.

4.2.4 RAID 0/1 Controller with 512 MB Cache

Category	Product Name / Description	Part Number
Storage Controller Required	**RAID Controller (512MB, RAID 0/1)** LSI MegaRAID SAS 9267-8i RAID 0/1, 512 MB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-149
RAID BBU Recommended	**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-155
Cable Required	**Internal SATA Cable** mini-SAS to 2x SATA	K410-253(00)
Drive Cage	**3.5-inch Drive Cage** 2 x 3.5-inch non hot plug (fixed) hard drive bays	(Standard)
Drive 2 slots available	**500GB 7.2K non-Hot Plug 3.5-inch SATA HDD** 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-359
	1TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-360
	2TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-361
	3TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 3TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-362

NOTE:

- All hard drives within a RAID array should be of the same capacity.

4.3 2.5-inch Drive Configuration

4.3.1 Embedded SATA non-RAID Controller

Category		Product Name / Description	Part Number
Storage Controller		**Embedded SATA Controller** 2x 6Gb/s SATA, 2x 3Gb/s SATA	(Standard)
Cable **Required**		**Internal SATA Cable** 3x Single-SATA to mini-SAS	K410-241(00)
Drive Cage		**2.5-inch Drive Cage** 3 x 2.5-inch hot plug hard drive bays	(Standard)
Drive **3 slots available**	**SATA HDD**	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358

NOTE

- Hot plug insertion/removal is not supported with the embedded SATA non-RAID controller.

4.3.2 Embedded SATA RAID Controller

Category		Product Name / Description	Part Number
Storage Controller		**Embedded SATA Controller** 2x 6Gb/s SATA, 2x 3Gb/s SATA, RAID 0/1 capable	(Standard)
Cable **Required**		**Internal SATA Cable** 3x Single-SATA to mini-SAS	K410-241(00)
Drive Cage		**2.5-inch Drive Cage** 3 x 2.5-inch hot plug hard drive bays	(Standard)
Drive **3 slots available**	**SATA**	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358

NOTE

- Embedded SATA RAID controller is supported only on Windows operating systems. An optional RAID controller is required to configure RAID array for other operating systems.
- All hard drives within a RAID array should be of the same capacity and rotation speed.

4.3.3 Up to three Drives with RAID 0/1 Controller with 128 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (128MB, RAID 0/1)** Promise SuperTrak TX8760T-128 RAID 0/1/10, 128MB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 3Gb/s	N8103-128
RAID BBU Recommended		**RAID Battery Backup Unit** for Promise SuperTrak TX8760T	N8103-141
Cable Required		**Internal SAS Cable** mini-SAS to mini-SAS	K410-180(00)
Drive Cage		**2.5-inch Drive Cage** 3 x 2.5-inch hot plug hard drive bays	(Standard)
Drive 3 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-710
		200GB Hot Plug 2.5-inch SAS SSD 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed..

4.3.4 Up to three Drives with RAID 0/1 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1)** LSI MegaRAID SAS 9267-8i RAID 0/1, 512 MB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-149
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-155
Cable Required		**Internal SAS Cable** mini-SAS to mini-SAS	K410-180(00)
Drive Cage		**2.5-inch Drive Cage** 3 x 2.5-inch hot plug hard drive bays	(Standard)
Drive 3 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-710
		200GB Hot Plug 2.5-inch SAS SSD 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.

4.3.5 Up to three Drives with RAID 5 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1)** LSI MegaRAID SAS 9267-8i RAID 0/1/5, 512 MB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-150
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-155
Cable Required		**Internal SAS Cable** mini-SAS to mini-SAS	K410-180(00)
Drive Cage		**2.5-inch Drive Cage** 3 x 2.5-inch hot plug hard drive bays	(Standard)
Drive 3 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-710
		200GB Hot Plug 2.5-inch SAS SSD 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.

4.3.6 Up to three Drives with RAID 5 Controller with 1 GB Cache/Battery

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (1GB, RAID0/1/5/6)** LSI MegaRAID SAS 9267-8i RAID 0/1/5, 1 GB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-151
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-155
SSD Caching Recommended		**MegaRAID CacheCade** for LSI MegaRAID SAS 9267-8i NOTE: - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable Required		**Internal SAS Cable** mini-SAS to mini-SAS	K410-180(00)
Drive Cage		**2.5-inch Drive Cage** 3 x 2.5-inch hot plug hard drive bays	(Standard)
Drive 3 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-710
		200GB Hot Plug 2.5-inch SAS SSD 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed..

4.3.7 Up to three Drives with RAID 5 Controller with 1 GB Cache/CacheVault

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (1GB, RAID 0/1/5/6)** LSI MegaRAID SAS 9270CV-8i (with CV) RAID0/1/5/6/10/50/60, 1GB Cache, Int. 8ports, PCIe 3.0(x8), 6Gb/s, flash cache protection modules included	N8103-167
SSD Caching Recommended		**MegaRAID CacheCade** for LSI MegaRAID SAS 9267-8i NOTE: - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable Required		**Internal SAS Cable** mini-SAS to mini-SAS	K410-180(00)
Drive Cage		**2.5-inch Drive Cage** 3 x 2.5-inch hot plug hard drive bays	(Standard)
Drive 3 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-710
		200GB Hot Plug 2.5-inch SAS SSD 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.

4.3.8 Up to five Drives with RAID 0/1 Controller with 128 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (128MB, RAID 0/1)** Promise SuperTrak TX8760T-128 RAID 0/1/10, 128MB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 3Gb/s	N8103-128
RAID BBU Recommended		**RAID Battery Backup Unit** for Promise SuperTrak TX8760T	N8103-141
Cable Required		**Internal SAS Cable** mini-SAS to mini-SAS	K410-180(00)
Drive Cage		**2.5-inch Drive Cage** 3 x 2.5-inch hot plug hard drive bays	(Standard)
Optional HDD Cage Required		**Additional 2.5-Inch HDD Cage** 2x 2.5-inch hot plug hard drive bays Including 1x mini-SAS to 1x mini-SAS cable	N8154-37
Drive 5 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-710
		200GB Hot Plug 2.5-inch SAS SSD 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.

4.3.9 Up to five Drives with RAID 0/1 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1)** LSI MegaRAID SAS 9267-8i RAID 0/1, 512 MB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-149
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-155
Cable Required		**Internal SAS Cable** mini-SAS to mini-SAS	K410-180(00)
Drive Cage		**2.5-inch Drive Cage** 3 x 2.5-inch hot plug hard drive bays	(Standard)
Optional HDD Cage Required		**Additional 2.5-Inch HDD Cage** 2x 2.5-inch hot plug hard drive bays Including 1x mini-SAS to 1x mini-SAS cable	N8154-37
Drive 5 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-710
		200GB Hot Plug 2.5-inch SAS SSD 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All hard drives within a RAID array should be of the same capacity and rotation speed.

4.3.10 Up to five Drives with RAID 5/6 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1)** LSI MegaRAID SAS 9267-8i RAID 0/1/5/6, 512 MB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-150
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-155
Cable Required		**Internal SAS Cable** mini-SAS to mini-SAS	K410-180(00)
Drive Cage		**2.5-inch Drive Cage** 3 x 2.5-inch hot plug hard drive bays	(Standard)
Optional HDD Cage Required		**Additional 2.5-Inch HDD Cage** 2x 2.5-inch hot plug hard drive bays Including 1x mini-SAS to 1x mini-SAS cable	N8154-37
Drive 5 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-710
		200GB Hot Plug 2.5-inch SAS SSD 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.

4.3.11 Up to five Drives with RAID 5/6 Controller with 1 GB Cache/Battery

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (1GB, RAID0/1/5/6)** LSI MegaRAID SAS 9267-8i RAID 0/1/5/6, 1 GB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-151
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-155
SSD Caching Recommended		**MegaRAID CacheCade** for LSI MegaRAID SAS 9267-8i NOTE: - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable Required		**Internal SAS Cable** mini-SAS to mini-SAS	K410-180(00)
Drive Cage		**2.5-inch Drive Cage** 3 x 2.5-inch hot plug hard drive bays	(Standard)
Optional HDD Cage Required		**Additional 2.5-Inch HDD Cage** 2x 2.5-inch hot plug hard drive bays Including 1x mini-SAS to 1x mini-SAS cable	N8154-37
Drive 5 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-710
		200GB Hot Plug 2.5-inch SAS SSD 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD **1x 400 GB SAS SSD, 2.5-inch, 6Gb/s**	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.

4.3.12 Up to five Drives with RAID 5/6 Controller with 1 GB Cache/CacheVault

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (1GB, RAID 0/1/5/6)** LSI MegaRAID SAS 9270CV-8i (with CV) RAID0/1/5/6/10/50/60, 1GB Cache, Int. 8ports, PCIe 3.0(x8), 6Gb/s, flash cache protection modules included	N8103-167
SSD Caching Recommended		**MegaRAID CacheCade** for LSI MegaRAID SAS 9267-8i NOTE: - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable Required		**Internal SAS Cable** mini-SAS to mini-SAS	K410-180(00)
Drive Cage		**2.5-inch Drive Cage** 3 x 2.5-inch hot plug hard drive bays	(Standard)
Optional HDD Cage Required		**Additional 2.5-Inch HDD Cage** 2x 2.5-inch hot plug hard drive bays Including 1x mini-SAS to 1x mini-SAS cable	N8154-37
Drive 5 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-710
		200GB Hot Plug 2.5-inch SAS SSD 1x 100 GB SAS SSD, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD **1x 400 GB SAS SSD, 2.5-inch, 6Gb/s**	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.

5 Internal Optical Drive

Available Bays: 1

Product Name / Description	Part Number
Slim DVD-ROM drive	(Standard)
Internal DVD Super Multi Drive Slim DVD Super Multi drive, not including writing software	N8151-104F

NOTE:

- To install internal DVD Super Multi drive, the standard DVD-ROM drive needs to be removed.

6 Internal Tape / RDX drives

6.1 Tape / RDX Drive Selection

Refer to the section in accordance with your type of tape drives:

- DAT: Refer to **6.2.1**
- RDX: Refer to **6.2.2**

NOTE:

- No tape drive can be installed if you install optional 2.5-inch Drive Cage.
- Tape devices cannot be directly connected to VMware systems. For VMware systems, it is recommended to connect and configure an additional backup server via network.

6.2 Tape / RDX Configuration

6.2.1 DAT / USB

Category	Product Name / Description	Part Number
Controller	**Internal USB Controller** 1 x USB port or 1 x pin-header for front panel USB	(Standard)
Cable **Required**	**Internal USB Cable** 1x Internal USB to 1x USB device **NOTE**: The cable is required to install USB tape drive only.	K410-255(00)
	Internal USB Cable 1x pin-header for front panel USB to 1x USB device and 1x front panel USB port **NOTE**: The cable is required to install internal flash memory and USB tape drive. A USB tape drive occupies one front USB port.	K410-245(00)
Drive **1 bay available**	**Internal DAT (USB)** DDS3 / DDS4 / DAT72, Native capacity 36 GB **NOTE**: DDS1 / DDS2 format are not supported	N8151-69

6.2.2 RDX

Category	Product Name / Description	Part Number
Controller	**Internal USB Controller** 1 x USB port or 1 x pin-header for front panel USB	(Standard)
Cable **Required**	**Internal USB Cable** 1x Internal USB to 1x USB device **NOTE**: The cable is required to install USB tape drive only.	K410-255(00)
	Internal USB Cable 1x pin-header for front panel USB to 1x USB device and 1x front panel USB port **NOTE**: The cable is required to install internal flash memory and USB tape drive. A USB tape drive occupies one front USB port.	K410-245(00)
Drive **1 bay available**	**Internal RDX (USB)**	N8151-105

7 PCI Card

7.1 Network Interface Controller

Category	Product Name / Description	Part Number
1GbE	**1000BASE-T Adapter** Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1, FP / FH	N8104-138
	Dual Port 1000BASE-T Adapter Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1	N8104-132

NIC Teaming feature – NIC Teaming and bonding features

See the table below for supported network interfaces and OS combinations.

Windows supports BASP (Broadcom Advanced Server Program) teaming while Linux supports teaming with bonding function supported by OS.

Network Interface	Team	Operating Systems
1GbE NIC Embedded 1GbE NIC and N8104-138/-132	Up to four teams per one system Up to four ports per one team	Windows Server Red Hat Linux

Using iSCSI

See the table below for supported network interfaces and OS combinations.

Category	Network Interface	Operating Systems
1GbE	Embedded 1GbE NIC	Windows Server 2008 R2
	N8104-138	Windows Server 2008 R2
	N8104-132	Windows Server 2008 R2

NOTE:

- NIC Teaming feature is not supported on iSCSI interfaces.

7.2 Serial Port Adapter

Product Name / Description	Part Number
Serial Port Adapter Serial port fixed to PCI bracket	N8117-01A

NOTE:

- Up to one Serial Port Adapter can be installed.

8 Other Add-in Components

8.1 Internal Flash Memory

Available socket: 1

Product Name / Description	Part Number
Internal Flash Memory Internal flash memory to enable software and tools in the EXPRESSBUILDR DVD without DVD media **NOTE:** Before use, software and tools must be copied from the EXPRESSBUILDER DVD to the flash memory. The following operations can be performed with the flash memory: - Installation of Windows server with express setup - Installation of Starter Pack—the package of NEC qualified drivers and system setting tools - Installation of NEC ESMPRO Agent and Universal RAID Utility - Performance of the Test and Diagnosis Tool	N8115-05

8.2 Flash FDD

Choose the Flash FDD if you need to prepare an alternative device for a floppy drive.

Product Name / Description	Part Number
Flash FDD USB flash emulating USB floppy disk, Native capacity 1.44 MB	N8160-86

NOTE:

- Up to one derive can be connected

8.3 Input Devices

Product Name / Description	Part Number
Keyboard and Mouse Pack (US) 1 x 104-keys White USB keyboard, 1 x USB White Optical Wheel Mouse	(Standard)

9 Add-on Components

9.1 Server Management License

The server integrates the EXPRESSSCOPE Engine 3 as standard. Refer to **Server Management** for the standard management features. For more extensive remote KVM and remote media features, choose the following kit.

Product Name / Description	Part Number
Remote KVM and Media License Kit License for one server. Remote KVM and remote media are enabled regardless of OS status. Remote KVM: - Displays a graphics console on the web browser of the remote terminal (PC/server). - Controls keyboard and mouse via the remote terminals' web browser Remote media: Enables the user to use the CD / DVD / FD / Flash memory of the remote terminals (PC/server) as if accessing the local drives.	N8115-04

NOTE:

- Remote KVM and remote media features are not available for virtual machines.

9.2 Dust / Insect Proof Kit

The server supports the dust resistant feature. Choose the following kit to install the system in dusty places.

Category	Product Name / Description	Part Number
Front Bezel	**Dust Proof Bezel with Sensor** Including 1 set of filter replacement sensors, 1 set of dust proof filters	N8146-35
Filter	**Dust proof filter (5 pcs.)** For N8146-35 Dust Proof filter Removal capacity of particles : Up to 1 µm-sized	N8147-22

9.3 Medium and Cartridge

Category	Product Name	Drive supported	Part Number
RDX	RDX Cartridge (320GB)	N8151-105	N8152-26
	RDX Cartridge (500GB)	N8151-105	N8152-27
	RDX Cartridge (1TB)	N8151-105	N8152-33
DAT	DAT72(36GB) Medium 5 pack	N8151-69	N8152-08

References

Server Management

The EXPRESSSCOPE Engine 3, integrated into the server, provides superior remote control and system management features listed in the table below.

		Standard	With Remote KVM and Media License kit
Hardware monitoring	Temperature/hard drive[1]/fan/voltage/power consumption/degeneration(memory/hard drive[1])	✓	✓
	Hardware configuration information collection	✓	✓
	Hardware event log collection	✓	✓
Boot monitoring	BIOS/POST stall, Booting, OS stall, shutdown	✓[3]	✓[3]
Alerting	HW error, Boot error and OS panic (by SNMP, E-Mail)	✓	✓
Remote KVM (via LAN)	POST/BIOS setup, ROM utility	✓[2]	✓
	Panic screen, Boot screen	✓[2,4,5]	✓
	CUI-based screen (OS console)	✓[2,5]	✓
	GUI-based screen (OS console)	-	✓
Remote control (via LAN)	Remote reset/power on-off/ dump	✓	✓
	Remote Power Capping	✓	✓
	BIOS/BMC FW update	✓	✓
	Remote BIOS setup(partial configuration only)	✓	✓
	OS shutdown	✓[3]	✓[3]
	Remote media (CD/DVD/FD/USB)	-	✓
	CLP (Command Line Protocol) (DMTF compliant)	✓	✓
	Remote control via Web browser (multi user login at the same time)	✓	✓
	Scheduling (without UPS)	✓[3]	✓[3]
Maintenance	EXPRESSSCOPE® Profile key (Backup/restore BIOS/BMC setup information)	✓	✓
Others	Set automatic IP address via DNS/DHCP	✓	✓
	LDAP/Active Directory verification/user control	✓	✓
	Clock synchronization of main unit and the RTC	✓	✓
	Access log collection	✓	✓
Industry Standard	IPMI support	2.0	2.0

1 The feature is not supported on non-hot plug 3.5-inch drive.
2 The standard serial port is not available for the feature.
3 The feature is not supported on VMware systems.
4 Monitoring boot screens is not supported on VMware systems.
5 In VMware systems, only the direct console user interface is supported.

OS Support Matrix for PCI Cards and Embedded Controllers

Part Number	Product Name	WS 2008R2	WS 2008	WS 2008 x64	WS 2003R2	WS 2003R2 x64	RHEL 5	RHEL 5 x64	RHEL 6	RHEL 6 x64	VMware ESXi 5.0	VMware ESXi 5.1
-	Embedded SATA non-RAID Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
-	Embedded SATA RAID Controller	✓	✓	✓	✓	✓	-	-	-	-	-	-
-	Embedded 1GbE NIC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-128	RAID Controller (128MB, RAID 0/1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
N8103-149	RAID Controller (512MB, RAID 0/1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-150	RAID Controller (512MB, RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-151	RAID Controller (1GB, RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-167	RAID Controller (1GB, RAID 0/1/5/6)	✓	✓	✓	-	-	✓	✓	✓	✓	-	-
N8104-138	1000BASE-T Adapter (1ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-132	1000BASE-T Adapter (2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Supported PCI cards and Installable Slots

		Slots			
Part Number	Product Name	#1	#2	#3	#4
N8103-128	RAID Controller (128MB,RAID 0/1) [PCIe 2.0 x8]	✓	-	-	-
N8103-149	RAID Controller (512MB,RAID 0/1) [PCIe 2.0 x8]	✓	-	-	-
N8103-150	RAID Controller (512MB,RAID 0/1/5/6) [PCIe 2.0 x8] [1]	✓	-	-	-
N8103-151	RAID Controller (1GB,RAID 0/1/5/6) [PCIe 2.0 x8] [1]	✓	-	-	-
N8103-167	RAID Controller (1GB, RAID 0/1/5/6) [PCIe 3.0 x8] [1]	✓	-	-	-
N8104-138	1000BASE-T Adapter (1ch) [PCIe 2.0 x1]	✓	✓	✓	-
N8104-132	1000BASE-T Adapter (2ch) [PCIe 2.0 x1]	✓	✓	✓	-
N8117-01A	Serial Port Adapter	✓	✓	✓	✓

[1] Not supported on 3.5-inch model.

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For hard drive capacity measurements, 1 GB = 1 billion bytes. Actual formatted capacity is less.

The USB interface is not guaranteed to work properly for all USB devices.

Revision History

Revision	Date	Description
2.0	November 7, 2012	**New products added:** 200GB SSD / N8150-711 400GB SSD / N8150-712 RAID Controller (1GB, RAID 0/1/5/6) / N8103-167 **Discontinued products removed:** 100GB SSD / N8150-707 **Others:** VMware ESXi5.1 supported
1.0	July 26, 2012	Initial release